Interagency Workshop on Next Generation DNA Sequencing

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Defense Biometrics and Forensics Office

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DNA Sequencing Workshop Objectives

- **Review current DNA sequencing technology and possible forensic and human ID applications**
  - Establish a common starting point for further discussions and planning within the Government forensic community
- **Share information about active Government efforts in this area**
- **Begin to outline possible cooperative strategies for establishing programs to accelerate progress toward core applications**
  - Identify common ground among organizations
    - Application interests
    - Priorities
    - Concerns
  - Discuss possible next steps
    - Formation of a Steering Committee
    - Formation of subcommittees/working groups for technology and policy

Rapid DNA Equipment Development: Successful Cooperative Model

- **Interagency consensus: Combine DoD, DOJ, DHS efforts to create unprecedented common core rapid DNA analysis instruments**
- **Coalition that formed in 2009 has enabled accelerated development of prototype systems**
- **Cooperative approaches are desired path forward**

ANDE Steering Committee

ANDE Technical Advisors

Notional path Forward

Today

Fieldable Rapid DNA Profiling Equipment

1st Gen Rapid STR Analysis Prototypes

- **Fully Automated**
- **Non-lab environment**

Future developments extend applications, accelerate, miniaturize

Advanced Human DNA ID Applications

State-of-the-art DNA analysis methods with increased information content

- **Scientific foundations**
- **Method development**
- **Lab/data infrastructure**
- **Policy/standards**

Next-Gen Field ID

Advanced Human DNA analysis near point-of-need

- **Automation**
- **Instrument suitability**
- **Logistics**

Vision: Sequencing For Forensic Applications

Potential Benefits

- Increase capacity and reduce cost for DNA ID
  - Multiplexed sequencing for increased throughput
  - STR, Y-STR, mtDNA, SNP in one test
- Make DNA identification more capable
  - Enhanced kinship data, beyond parent-child
  - Assess potential for future FDP and activity profiling
- Make DNA identification more secure
  - Maximize resistance to evidence tampering

Approach

- Establish scientific foundation
  - Ensure backwards compatibility with existing ID databases
  - Population studies to establish validity of new analyses
- Enable forensic uses of sequencing technology
  - Touch sample sensitivity
  - Mixture analysis
- Track and benchmark performance of multiple systems

Strategy

- Leverage ongoing technology investments
  - Industry competition driving cost / throughput improvements
  - Some USG programs already funding fieldable sequencers
- Seek coordinated investment in foundational science to foster inter-agency effort
  - Larger effort than one agency likely to tackle
  - Identify and prioritize overlapping needs
  - ANDE Program as cooperative model